

NSTX Weekly Report (November 19, 2010)

FY 2011 NSTX plasma operations started on October 4, 2010

Planned Run Weeks: TBD

Run Weeks Completed: 4.21 run weeks and 839 plasma shots

Members of the NSTX research team attended the Workshop on MHD Stability Control & Joint US-Japan Workshop (3D Magnetic Field Effects in Control) at Madison, Wisconsin, November 15-17, 2010. The NSTX presentations were “Comparison of RWM Theory and Experiment” by Jack Berkery (Columbia University), “Role of plasma edge in global stability and control” by Jon Menard (PPPL), “Analytic NTV calculations across the regimes and benchmark with FORTEC-3D drift-kinetic code simulation” by Jong-Kyu Park (PPPL), and “Stabilization of Low Internal Inductance Plasmas and First RWM State Space Control Experiments in NSTX” by Steve Sabbagh (Columbia University) (J. Menard, S. Sabbagh)

Seoul National University graduate student June-Woo Juhn returned to Korea after spending a year at PPPL. The primary focus of his visit was to develop a concept for density feedback control for NSTX, using signals from the FIRE TIP multichannel interferometer. This work, which was performed in collaboration with the University of California at Davis, is described in an upcoming Review of Scientific Instruments article entitled “Fringe-jump corrected FIRE TIP for a real-time density feedback control system of NSTX plasmas.” (R. Kaita)

On Wednesday, Nov. 18th, Stefan Gerhardt gave a presentation on NSTX halo current rotation results to a meeting of Working Group #6 of the MHD ITPA. Examples of halo current toroidal rotation during disruptions was presented, and examples where applied $n=1$ fields were unable to halt the rotation were shown. (S. Gerhardt)

Engineering Operations (A. von Halle, C. Neumeier)

The NSTX outage continued this past week with the first in-vessel access for initial inspections and photographs. A temporary floor has now been installed in the vessel, and lithium clean-up operations as well as diagnostic calibrations utilizing the Romer measuring arm are in progress. A draft procedure for in-situ cleaning of the LLD plates has been generated and is out for review. TF flex bus removals are in progress to allow for detailed OH flex bus, water fitting, and select TF joint inspections. The bay F and bay K LITER valve and shutter assemblies have been removed from the vessel for refurbishment. Also this week, the neutral beam helium refrigerator compressors were removed for refurbishment, and electricians are making good progress on MSE-LIF diagnostic and Switching Power Amplifier upgrade (SPA-2) installations.

Access to the NSTX test cell will be available Monday and Tuesday this coming week.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

- Liquid Lithium Divertor (LLD)
 - Initial inspection of the LLD after vessel venting indicated that

- a) It exhibited no apparent plasma facing surface damage after operation with 1 MA, 4 MW NBI discharges with outer strike points on the middle of the LLD.
 - b) Its appearance was consistent with it having received a sufficiently thick lithium deposition to have supplied the needs of the immediately preceding experiments.
 - c) Additional conclusions are pending removal of the surrounding graphite tiles for LLD edge inspection, and the removal of its lithium carbonate (Li_2CO_3) coating that occurred as a result of the venting.
- A procedure for cleaning the LLD by converting its surface coating of lithium carbonate to water soluble lithium acetate was drafted and is under review.
- Lithium Evaporators (LITERS)
 - All 4 LITER units were emptied of any remaining lithium using the High Bay Fill Stands. The ovens are presently under argon for assessment of required maintenance.
 - Molybdenum Inner Divertor Tiles
 - A Final Design Review for installing molybdenum plates on the row-1 tiles of the inner divertor (next to CHI gap) was successful pending resolution of chits
 - Lithium Particle Centrifugal Injection
 - Preparations started for a Peer Review of installation of a Lithium Particle Centrifugal Injector for ELM pacing experiments.
 - Lithium R&D
 - Testing of a prototype LLD liquid lithium fill system was started. The initial test, configured in a geometry similar to that of a lower divertor port, successfully raised about 10 g of liquid lithium from its reservoir to the height of the prototype LLD plate. It is now planned to test movement of the applied lithium over the prototype LLD plate.

Diagnostic Operations (R. Kaita)

- In-vessel diagnostic calibrations have begun. Systems that have been checked include the halo current sensor tiles and the high-density Langmuir probe array in the liquid lithium divertor (LLD) region. The locations of the quartz microbalance (QMB) deposition monitors were also measured.